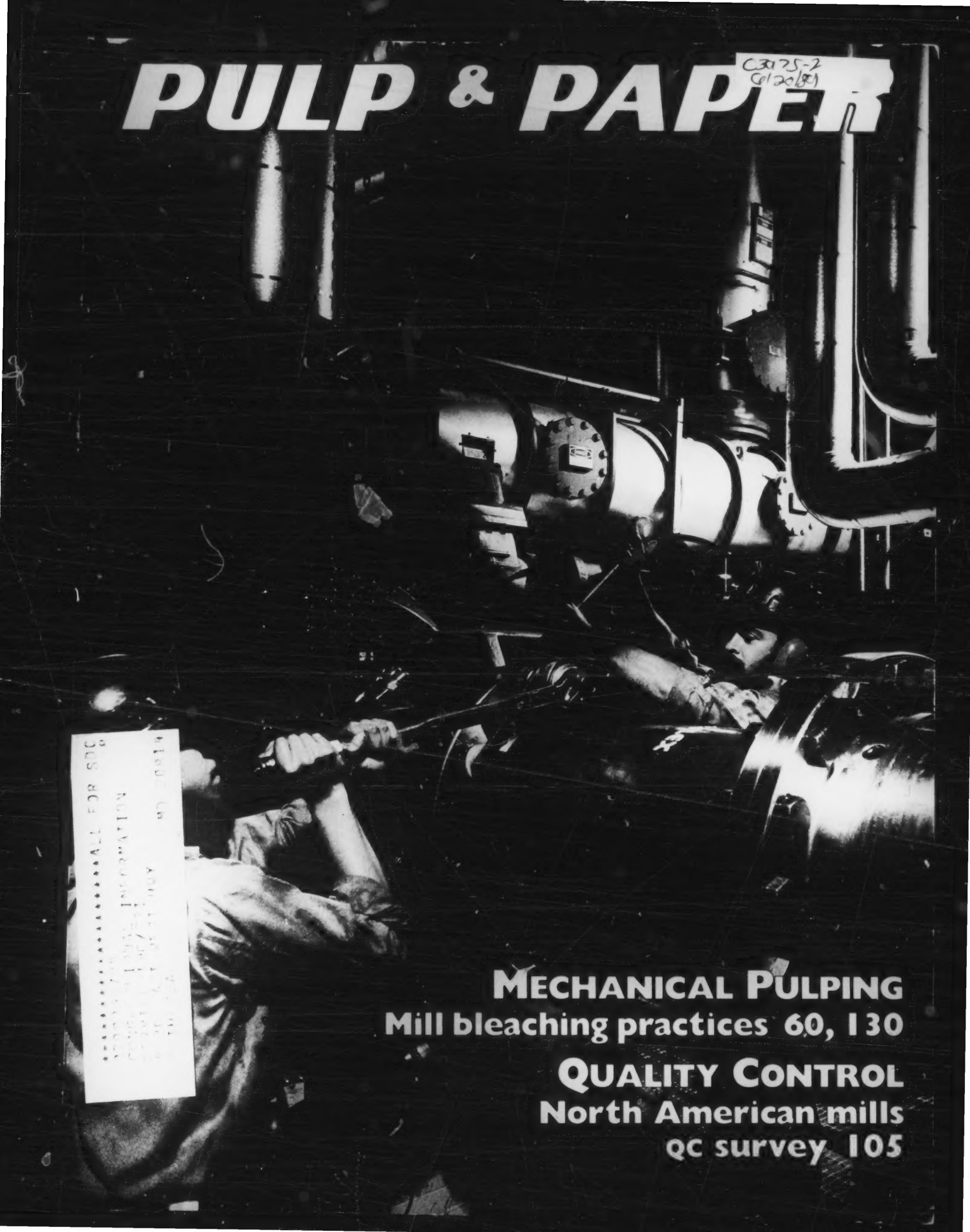


PULP & PAPER

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Atlanta: 2000 Powers Ferry Center, Suite 450
 Marietta, Ga. 30067, (404) 952-1801, Fax (404) 933-0666
 Chicago: 35 E. Wacker Drive, Chicago, Ill. 60601
 (312) 372-6238, Fax (312) 372-3864
 San Francisco: 500 Howard Street, San Francisco, Calif.
 94105, (415) 397-1881, Telex 278273, Fax (415) 544-0256
 New York: 370 Lexington Avenue, New York, N.Y. 10017,
 (212) 683-9294, Telex 220442, Fax (212) 725-0915
 Brussels: Chaussée de Charleroi 123a, Boite 5, B-1060,
 Brussels, Belgium, Telex 846-24672

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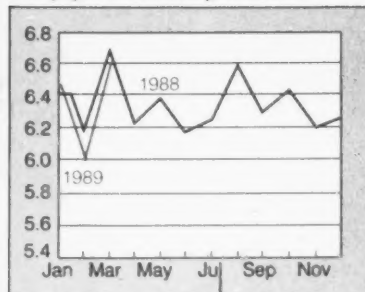
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MONTH IN STATISTICS

U.S. paper and board production



U.S. production of paper and paperboard totaled 6.6 million tons in March, down 1.9% from March 1988, which had the highest monthly production total on record, according to the American Paper Institute. First-quarter production totaled 19.2 million tons, down 1.2% from first-quarter 1988, but most of the decrease was due to an extra day in February 1988. After seasonal adjustments, the rate of production for the first quarter stood at 77.0 million tpy, down 0.4% from last year.

Among major grades, uncoated groundwood and tissue were the only areas showing gains compared with a year earlier. Fiber box shipments remained relatively healthy, with a 2.4% gain over last year after adjusting for one less day this March.

Canadian newsprint shipments totaled 813,000 metric tons in March, down 7.7% from a year earlier, while operating rates skidded to 94%. According to API, the large increases in Canadian exports to the U.S. in January were due in part to problems caused by the switch to the new Harmonized Code classification system. Instead of the big double-digit increases reported last month, U.S. imports in January declined an estimated 3.7% for Canadian newsprint and rose 11.6% for pulp. ■

	Latest month (000 short tons)	% change from year ago	Annualized year-to-date (000 short tons)	% change from year ago
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PAPER & PAPERBOARD PRODUCTION¹

Newsprint	Mar.	516	1.2	5,874	-1.3
Uncoated groundwood (s)	Mar.	142	2.2	1,682	6.2
Coated paper (s)	Mar.	592	-9.3	7,101	-5.7
Uncoated free-sheet (s)	Mar.	972	-4.7	11,346	-1.6
Other printing/writing	Mar.	124	-5.3	1,472	-0.3
Total packaging and other paper (s)	Mar.	448	-1.3	5,243	-2.0
Tissue	Mar.	505	6.5	5,629	3.0
Total paper	Mar.	3,299	-2.5	38,347	-1.5
Unbleached kraft paperboard	Mar.	1,653	-2.5	19,313	-1.4
Semichemical medium	Mar.	508	3.3	5,818	2.6
Bleached paperboard	Mar.	391	2.1	4,448	-1.8
Recycled paperboard	Mar.	743	-3.6	8,748	-2.3
Total paperboard	Mar.	3,296	-1.4	38,324	-0.9

Total U.S. paper and paperboard output	Mar.	6,595	-1.9	76,671	-1.2
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PULP, WASTEPAPER & FIBER²

Total U.S. woodpulp production	Feb.	4,821	-2.0	61,724	0.9
Market pulp production	Feb.	687	0.1	8,785	2.8
Wastepaper consumption at paper/board mills	Feb.	1,528	-0.1	18,607	0.6
Pulpwood consumption (cords)	Feb.	7,837	1.2	97,170	1.4

CONVERTED PRODUCTS STATISTICS³

Corrugated box shipments (billion ft ³)	Mar.	26,755	-1.8	77,283*	0.6
Containerboard inventories at U.S. box plants and mills	Mar. 1	2,614	1.0		

INTERNATIONAL TRADE²

U.S. paper imports (including products)	Feb.	1,001	-1.1	12,383	0.9
Imports of Canadian newsprint	Feb.	652	-3.4	8,009*	-3.5
U.S. paper exports (including products)	Feb.	524	15.2	5,772	13.5
Exports of unbleached kraft linerboard	Feb.	196	16.7	2,133	10.8
Exports of woodpulp	Feb.	507	14.2	5,784	15.5
Norscan pulp inventories ⁴	Mar. 31	760	-5.6		
Norscan pulp operating rates ⁴	Mar.	97%	98%	100%	99%

CANADIAN STATISTICS⁵ (reported in metric tons)

Total newsprint shipments	Mar.	813	-7.7	2,307*	-3.0
Operating rates	Mar.	94%	100%	97%	100%
Inventories held by U.S. consumers	Mar. 31	1,422	-6.0		
Other paper/board shipments	Mar.	575	-2.9	1,648	-0.1
Woodpulp shipments (export only)	Mar.	741	-1.1	2,017	0.6
Operating rates	Mar.	93%	99%	96%	97%

1. American Paper Institute. 2. API, Bureau of Census, American Pulpwood Assn. 3. Fibre Box Assn., Paperboard Packaging Council. 4. North American/Scandinavian paper-grade market pulp. 5. Canadian Pulp & Paper Assn. 6. Not annualized. (s) = Shipments.

Recycled paperboard: New capacity, quality improvements opening markets for producers

Grade structure: Recycled paperboard is made primarily from secondary fiber or wastepaper and is produced on either a fourdrinier, multi-ply, or cylinder paper machine. Grades include folding boxboard, corrugating medium, linerboard, gypsum liner, and core/can/tube stock.

Markets: Market demand for recycled paperboard grades, as measured by their 1989 capacity share, are folding boxboard, 26.8%; setup boxboard, 2.8%; corrugating medium, 19.4%; gypsum linerboard, 14.6%; linerboard, 6.2%; container chipboard and filler board, 0.5%; core/can/tube stock; and other converting grades, 29.7%.

Production/capacity: Production increased 3.1% to 8.771 million short tons in 1988, marking the third successive year of growth. Demand continued to be strong in early 1989, and total recycled paperboard production is even with last year's production trend. Last year, mill operating rates improved because industry capacity increased only 2.2%. Mills operated at about 93% of capacity in 1988, compared with about 92% in 1987. This year, capacity is expected to rise 1.1% to 9.572 million tons while production increases at a 1.2% rate to 8.876 million tons. This will keep mill operating rates at about the same 93% level.

In the past three years, improved markets and the increased concentration of ownership have encouraged capital investments that have yielded about 500,000 tpy of new capacity. Containerboard grades, linerboard and corrugating medium, accounted for the largest gains in capacity. In late 1988, however, Nolichecky Industries Corp. was forced into bankruptcy, shutting down about 180,000 annual tons of recycled containerboard capacity. Nonetheless, the strong demand for recycled paperboard grades, coupled with the increasing need to reduce solid waste, could lead to further capacity additions.

Outlook: Demand for recycled containerboard grades and gypsum liner is expected to weaken slightly in 1989 due to a general slowdown in construction activity and industrial production by the end of this year. Core/

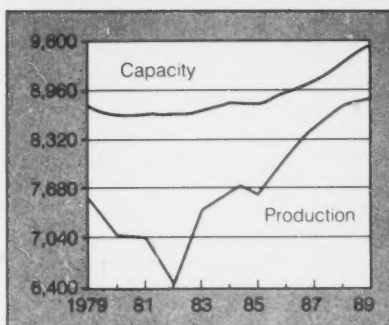
can/tube stock should fare slightly better because these grades are used in a variety of consumer packaging applications in addition to their industrial uses. In 1988, recycled medium production increased 9.3% to 1.757 million tons, gypsum liner production dropped 1.0% to 1.201 million tons, and core/can/tube stock production increased 8.1% to 1.255 million tons.

Folding carton and setup boxboard demand should remain healthy this year due to continued strong consumer buying trends. Producers of recycled folding boxboard increased output by 3.5% to 2.475 million tons in 1988, which was a smaller gain than in 1987. The falloff in growth was due more to capacity constraints than a slackening in demand. Mills operated around the clock to meet customers' demand, which was heightened because bleached carton stock was in short supply most of the year. Although demand has eased since last year, folding carton stock remains in short supply and very little new capacity is scheduled to come online this year.

Prices: Prices for recycled folding carton stock improved considerably in 1988. Producers raised prices of clay-coated boxboard grades three times during the year: in February, June, and October. Each increase was approximately \$30/ton, and transaction levels rose from \$390 to \$415/ton at the beginning of the year to \$480 to \$510/ton at year end. The lower end of each price range represents newsprint-back grades, while the upper end represents kraft-back grades. Plain bending chipboard prices increased to about \$340/ton, and white-lined and specialty grades increased to about \$435/ton.

Historical prices for clay-coated 20-pt folding carton boxboard (rolls, \$/short ton, year end): 1980, \$380; 1981, \$400/\$425; 1982, \$380/\$425; 1983, \$370/\$425; 1984, \$375/\$425; 1985, \$350/\$400; 1986, \$380/\$420; 1987, \$390/\$415; 1988, \$480/\$510. Bending 20-pt chipboard (rolls, \$/short ton, year end): 1980, \$260/\$275; 1981, \$270/\$280; 1982, \$280; 1983, \$280/\$300; 1984, \$300; 1985, \$300; 1986, \$320; 1987, \$320; 1988, \$340.

SUPPLY/DEMAND (000 tons)



FORECAST (000 tons)

	1987	1988	1989e
Production	8,506	8,771	8,876
Capacity	9,267	9,468	9,572
Utilization rate	91.8	92.6	92.7
Imports	151	143	120
Exports	60	67	50
Apparent U.S. consumption	8,597	8,847	8,946
lb/capita	71.46	71.85	72.06
GNP ratio ¹	2.26	2.26	2.25

e = Estimate

1. 1,000 tons/billion \$ real GNP.

TOP U.S. PRODUCERS (000 tpy)

	Annual capacity	Market share (%)
1. Jefferson Smurfit ¹	1,220	12.7
2. Sonoco Products ²	750	7.8
3. Newark Group ³	735	7.7
4. Rock-Tenn ⁴	532	5.6
5. Carastar ⁵	525	5.5
6. Inland Container	475	5.0
7. Waldorf	380	4.0
8. U.S. Gypsum	332	3.5
9. National Gypsum	320	3.3
10. Packaging Corp.	210	2.2

Market share of top five companies:
39.3%

Market share of top ten companies:
57.2%

Total U.S. capacity (1989):
9,572 million short tons

1. Reflects combined operations with Container Corp. of America.
2. Acquired Federal's Richmond, Va., mill in 1988.
3. Acquired Federal's Los Angeles, Calif., mill in 1988.
4. Acquired Mead's Lynchburg, Va.; Cincinnati, Ohio; and Otsego, Mich., mills in 1987.
5. Acquired U.S. Gypsum's Camden, N.J., mill in 1988.

SALES AND EARNINGS

U.S. companies post 22.2% rise in profits

U.S. paper companies continued to rack up favorable earnings through first-quarter 1989, although profit levels began to slack off somewhat after two years of record results. A *Pulp & Paper* survey of 29 paper companies showed that first-quarter profits were 22.2% over 1988's first quarter, rising to \$1.7 billion. Sales of \$22.6 billion were 11.9% higher than the year-earlier period.

The strong markets continue to be bleached paperboard and bleached softwood kraft pulp, while printing and writing, tissue, and containerboard grades are in more balanced supply. The only serious weakness was reported in the newsprint market, which is facing a glut of new capacity over the next two years. Overall, most paper companies are confident that the momentum built during the last three years will continue through at least the next quarter and possibly through the year.

International Paper Co. chairman and CEO John A. Georges said that IP's key markets—reprographic paper, containerboard, bleached board, and market pulp—continued to be strong in first-quarter 1989. IP's profits increased 40.3% to \$223 million, while sales improved 13.0% to \$2.6 billion.

Georgia-Pacific Corp. reported a 45.3% jump in profits to \$154 million. The pulp and paper segment bolstered G-P's sales—increasing 15.7% to \$2.4 billion, which helped to offset sluggish profits in the building products sector. T. Marshall Hahn Jr., chairman and CEO, said steady demand for the company's key products as well as improved pricing for some grades contributed to the strong performance. Hahn additionally noted that G-P expects operating profits to reach record levels again in 1989, reflecting the full-year contributions of the Brunswick Pulp & Paper acquisition, the new white paper machine at the Port Hudson, La., mill, and the recently rebuilt linerboard machine at the Monticello, Miss., facility.

Weyerhaeuser Paper Co. came in with profits of \$148 million—29.1% above the year-earlier period, despite continued lower results in its forest products and building materials busi-

ness segments that plagued producers last year. Sales for the company were up 8.6% from the year-ago level to \$2.3 billion.

Champion International Corp. reported that profits rose 11.3% to \$113 million on sales of \$1.3 billion. Champion said the higher earnings, attributable to continued improvement in its paper segment, were tempered by downtime caused by machine modernizations and some weather-related problems.

Paperboard makers pleased. Great Northern Nekoosa Corp. posted an increase in profits of 19.2% to \$93.3 million on a rise in sales of 16.9% to \$986 million. William R. Laidig, chairman, said that GNN "continues to enjoy strong business conditions in most product lines. We increased prices of market pulp and some business papers in the first quarter and again at the beginning of the second quarter."

Union Camp Corp.'s chairman and CEO, Gene Cartledge, noted that in-

U.S. paper industry results.

Paper companies	Full year (\$000)			
	Sales 1988	% Change	Earnings 1988 ¹	% Change
Badger Paper Co. Inc.	\$19,466	17.7%	\$1,326	105.3%
Boise Cascade Corp.	1,102,220	8.4%	78,250	14.2%
Bowater Inc.	356,680	3.9	38,913	2.5
Champion International	1,288,709	1.8	113,508	11.3
Chesapeake Corp.	187,972	16.5	12,858	29.9
Consolidated Paper Corp.	242,439	4.9	43,410	9.8
Federal Paper Board Co.	284,724	16.0	47,096	115.4
Gaylord Container Corp	178,000	17.8	6,000	-40.6
Georgia-Pacific Corp.	2,447,000	15.7	154,000	45.3
P.H. Glatfelter	155,421	142.	24,386	32.8
Great Northern Nekoosa	986,400	16.9	93,300	19.2
International Paper Co.	2,600,000	13.1	223,000	40.3
James River Corp. (1/24)	1,400,000	16.7	59,000	20.4
Jefferson Smurfit Corp.	319,833	2.2	34,909 ²	7.7
Kimberly-Clark Corp.	1,421,800	9.9	103,100	10.5
Louisiana-Pacific Corp.	467,000	12.8	39,900 ²	41.0
Mead Corp.	1,128,900	4.0	52,600 ²	-20.1
Mosinee Paper Corp.	58,780	-0.3	3,646	122.9
Pentair Inc.	274,800	41.4	9,000	1.1
Pope & Talbot Inc.	147,503	27.5	9,437	18.6
Potlatch Corp.	297,375	15.2	35,912	35.5
Scott Paper Co.	1,268,900	12.7	86,500	16.9
Sonoco Products Co.	433,134	15.1	24,573	10.4
Stone Container Corp.	1,127,400	27.9	86,800	32.9
Temple-Inland	462,600	8.7	54,500	19.5
Union Camp	706,226	9.4	79,718	18.0
Westvaco Corp. (1/31)	554,600	10.6	48,700	29.5
Weyerhaeuser Paper Co.	2,321,292	8.6	148,087	29.1
Willamette Paper Co.	437,816	8.2	39,793	-1.4
Total	\$22,676,990	11.9%	\$1,750,896	22.2%

1. Income after taxes, from continuing operations, excluding most significant nonrecurring items in both years.

2. **Jefferson Smurfit:** Data includes preferred stock dividends received on an after-tax basis from 50%-owned affiliate Container Corp. of America. **L-P:** Year-ago figures restated to reflect spin-off of Fibreboard Corp. in June 1988. **Mead:** 1988 income includes \$11.2-million gain from sale of recycled board business.

creased paper products shipments as well as significantly higher selling prices helped boost the company's earnings 18.0% to \$79.7 million. Sales improved 9.4% to \$706 million from the same period a year earlier.

Gaylord Container Corp. was one of the few companies to show a decline in profits for its second quarter ended Mar. 31. Earnings dipped 40.6%, reflecting mill downtime for capital investment and maintenance at the Bogalusa, La., and California mills. Sales, however, were up 17.8% to \$178 million.

Federal Paper Board Inc. reported that profits surged 115% to \$47 million over the year-earlier period, and the company racked up a 16% increase in sales to \$284 million. John R. Kennedy, president, said the gains reflect a rise in volume as well as favorable pricing for bleached paperboard and market pulp.

Publication paper gaining. Mead Corp. reported its first-quarter earnings dropped 20.1% to \$52.6 million. Chairman and CEO Burnell R. Roberts noted that the paper division performed "particularly well" during the quarter, boosting sales 4% to \$1.1 billion. Roberts attributed the growth to a significant improvement in earnings from Mead's Chillicothe, Ohio, mill.

Still prospering from the market's protracted boom, Boise Cascade Corp. reports that its first-quarter net income climbed 14.2% to \$78 million. Revenues rose 8.4% to \$1.1 billion. The largest segment of the company's paper operations, uncoated white paper, continued to show good strength, said chairman and CEO John B. Fery.

John A. Luke, pres. and CEO of Westvaco Corp., expects the strong sales and earnings it achieved for its first quarter ended Jan. 31 to continue into the second and third quarters. "We will make significant capital investments in three of our large paper machines and do a substantial amount of work on one of our largest recovery boilers," he said.

Tissue results strong. Despite still-rising fiber costs, James River Corp. posted a 20.4% jump in earnings to \$58.9 million on sales, up 16.7% to \$1.4 billion for its third quarter.

Scott Paper Co. said the tissue segment of its U.S. personal care and cleaning business had record profit growth of 24%, which helped boost company profits 16.9% to \$86.5 million. Company revenues rose 12.7% to \$1.3 billion. ■

Canadian profits sink 14.1%; strong currency blamed

Predictions of an industry downturn in 1989 began to come true for many Canadian forest products companies in the first quarter as profits plummeted 14.1% on a 0.5% drop in sales. Producers attributed the decline to a rising Canadian dollar, which, relative to the U.S. dollar, was about 5¢ higher than it was in the same quarter a year ago and to a weak newsprint market.

The newsprint market has been suffering since last spring from declining consumption and anticipation of new machines starting up over the next several years. This has led to widespread industry price discounting. The weakness in newsprint, however, was partly offset by continued strong demand and rising prices for market pulp. Most companies also reported higher income from fine paper and paperboard operations, while results from wood products were mixed.

Noranda Forest Inc. reported that its profits dropped 7.9% to C\$58 million during the first quarter. Sales, however, were just under \$1.2 billion—up 3.4% from a year ago. The decline in newsprint and lumber margins was largely offset by gains in pulp, printing and writing paper, and paperboard. Pulp markets remained

tight, and printing and writing paper shipments and prices remained firm despite some decline in order backlogs. Adam H. Zimmerman, chairman, said Noranda's outlook for the rest of 1989 is positive, as operations are running "exceptionally well" and markets for its products are "generally in good shape."

Abitibi-Price Inc. suffered a drop in earnings of 40.24%, which chairman and CEO Bernd K. Koken attributed to downward pressure on newsprint prices, shrinking margins, and inflationary cost increases that "are greater than Abitibi has experienced in six years." However, Koken said that "while prices stink, business has been pretty good," adding that sales volumes improved 1.3% over first-quarter 1988 to C\$810 million. Although earnings of the Diversified Group are close to those of a year ago, the Printing Papers Group earnings suffered a setback in first-quarter 1989 as a result of a production problem at one mill early in the year.

Strong pulp and containerboard markets and a high demand for specialty lumber in offshore markets helped bolster MacMillan Bloedel Ltd.'s earnings but couldn't offset the stronger Canadian dollar and softening newsprint market. MB's profits

Canadian paper industry results.

Companies	Sales	First-quarter earnings (C\$000)		
		Change 1989/88	Earnings ¹	Change 1989/88
Abitibi-Price Inc.	\$810,000	1.3%	\$26,300	-40.2%
Canadian Pacific	711,000	-3.4	65,100	-12.4
Canfor Corp.	202,000	-31.5	30,200 ²	4.1
Cascades Inc.	162,187	7.2	5,113	-12.0
Domtar Inc.	695,000	3.3	26,000 ²	-29.7
Donohue Inc.	165,700	6.3	14,500	-4.0
Fletcher Challenge	335,600	-5.8	36,100	-20.5
MacMillan Bloedel Ltd.	807,000	1.3	73,400	-19.9
Noranda Forest Inc.	1,200,000	3.4	58,000 ²	-7.9
Repap Enterprises Inc.	264,100	3.1	24,700	36.5
Scott Paper Ltd.	82,513	0.7	4,241	7.5
Tembec Inc. (9/31)	62,784	21.0	8,168	100.6
Weldwood of Canada	194,400	-6.9	16,200	4.5
Total	\$5,692,264	-0.5%	\$388,022	-14.1%

1. Income after taxes, from continuing operations, excluding most significant nonrecurring items in both years.

2. Canfor: Net sales reflect equity accounting for the 50% interests in Howe Sound Pulp & Paper and Canfor-Weldwood Distribution. Domtar: Year-ago figures have been restated to account for the sale of a high-pressure laminates business. Noranda: Year-ago figures restated for an accounting change.

dropped about 20% to \$73.4 million on sales of \$807 million. Ray Smith, MB president and CEO, noted that the newsprint market is showing signs of softening and net mill returns are down from 1988, although the company's order files are full. In addition, escalating costs and adverse weather conditions that affected British Columbia logging activity contributed to the decline. "As the economy slows, we're confident that investments we've made over the past few years... have equipped us to respond to any future market downturns," Smith said.

Canadian Pacific Forest Products Ltd. posted a 12.4% decline in earnings to \$65.1 million on sales of \$711 million. The company is particularly vulnerable to the fluctuations of the Canadian dollar, as more than half of

CPFP's sales are made in U.S. dollars. The company noted that a buoyant pulp market somewhat offset the profit decline.

Domtar Inc. said its decline in earnings was due to the higher-level interest expensed rather than capitalized following the start of commercial production at its Windsor, Que., facility. The company's profits dipped 29.7% to \$26 million, but sales improved 3.3% to \$695 million.

Fletcher Challenge Canada Ltd. president Ian Donald said that a weaker demand for newsprint because of increased world production and slower wood products markets means "net profits will be below the record performance we achieved last year." The company reported a 20.5% decline in profits to \$36.1 million on a 5.8% drop in sales. ■

MARKET PULP

Celgar Pulp studying plan to double capacity

Celgar Pulp Co. said it was considering a major investment in its 560-metric-ton bleached softwood kraft market pulp mill in Castlegar, B.C., that would double capacity and upgrade pollution controls. The mill is a joint venture of China International Trust & Investment Corp. (CITIC) and Power Consolidated (China) Pulp Inc. (a 50:50 venture of Consolidated-Bathurst Inc. and Power Corp.)

Part of the work would involve installation of an oxygen delignification pulping system and other environmental improvements in addition to work related to the expansion. A final decision on the project, which is expected later this year, would depend on obtaining financing, fiber supplies, and government permits, the company said.

Lorne Parnell, project director for

Consolidated-Bathurst, said the parameters of the project are being reviewed and should be determined by the beginning of the fourth quarter. H.A. Simons has been hired to do the definition study.

Parnell said the Celgar project would not affect the company's continued interest in pursuing a paper mill project in People's Rep. China or the U.S.S.R., although neither is likely to go ahead soon. Consolidated-Bathurst has been interested in ventures in these two countries since 1987. CITIC acquired its interest in the Celgar mill for C\$50 million, but the mill was worth more than C\$120 million, according to the Chinese agency's 1987 annual report. CITIC's share in the joint-venture was financed entirely through the Royal Bank of Canada. ■

Takema proposes 190,000-metric-tpy BCTMP mill

Takema Forest Products Ltd., a northern British Columbian wood products producer, has asked the province for timber harvesting rights in the Fort Nelson region to supply a 190,000-metric-tpy bleached chemi-thermo-mechanical pulp (BCTMP) mill, according to the province's Ministry of Forests. The estimated C\$195-million project is being reviewed, and a decision is expected to be announced by

midsummer.

Takema has asked the province for 315,000 m³ of coniferous pulpwood plus 350,000 m³ of aspen timber. The company has some timber rights and a sawmill/plywood operation near Fort Nelson (which is also the firm's headquarters) that would supply the new mill with chips. If all goes well with the project, startup is slated for 1993. ■

Donohue Matane pulp mill construction progressing

Donohue Matane Inc. is moving forward with construction of a 190,000-metric-tpy bleached chemi-thermo-mechanical softwood pulp mill in Matane, Que., with the foundation work expected to begin soon. Recently, five sawmills that will supply the main part of the fiber base for the mill were purchased from Les Bois de L'Est du Quebec (1986) Inc., which is a 50%-owned subsidiary of Rexfor, a Quebec government forestry agency.

Rexfor and Donohue Inc. are equal partners in the Donohue Matane project, which is expected to cost approximately C\$290 million, C\$250 million of which will be spent on mill construction, according to Denis Hamel, first vice president of Donohue. Donohue and Rexfor each have subscribed \$35 million in common shares in addition to an issue of C\$25 million of preferred shares that are held by Rexfor. An eventual participation of a third partner is not excluded, but potential candidates have not yet been identified. To finance the project, arrangements have been made to borrow C\$140 million through a syndicate of financial institutions led by the Toronto Dominion Bank and Caisse Centrale Desjardins.

In addition, a total of about C\$63 million in aid is being supplied by three levels of government to create an industrial infrastructure, including water supplies, fire protection, and waste treatment facilities. This includes C\$24.5 million from the federal coffers, C\$32.8 million from the provincial purse, and C\$5.9 million from Matane's budget.

Hamel indicated that work on the mill would continue through the fall, when buildings are expected to be finished so that work can be switched to the inside in winter. Equipment installation will begin next January or February, and the mill should be operational by October or November 1990, he noted.

Several pieces of equipment have been ordered, including eight 12,000-hp, 64-in. single-disc refiners from Hymac; bleaching chemical preparation equipment from Du Pont Canada; bleaching equipment from Hymac and Ingersoll-Rand; pulp flash dryers from Flakt; slab presses from Sunds Defibrator; and pumps from Allis Chalmers. ■

Weyerhaeuser upgrading Cosmopolis pulp mill

Weyerhaeuser Paper Co. will start up a \$9-million oxygen bleaching system at its 400-metric-tpd dissolving and specialty sulfite pulp mill in Cosmopolis, Wash., by March 1990. This will reduce the mill's use of chlorine by as much as 80%, resulting in cost savings while enabling the mill to meet stringent pollution abatement standards being considered by government agencies.

At the moment, the issue facing Cosmopolis is passing state-ordered toxicity tests, which the mill has

failed four times recently. Work on the new oxygen delignification system has already begun. When it is started up next March, trials will be run for customer evaluation. Product testing will continue until March 1991, and the mill will have the option of using the existing bleaching system, noted Bob Devones, mill technical director.

No downtime is expected, as ties of the new equipment will be made during scheduled maintenance shutdowns. ■

CAPITAL SPENDING

Paper industry spending to exceed \$15 billion

The Dept. of Commerce's latest capital spending survey reveals that paper companies continue to lead all other U.S. manufacturing industries in their projected increase in capital spending for 1989. Conducted during the first quarter, the survey found that paper companies plan to spend \$15.21 billion (current dollars) on new plant and equipment this year. This is an increase of 35.4% from the revised 1988 spending level.

In the October/November survey, paper companies said that they were planning a 28.3% increase for 1989. Spending rose 24.7% between 1988 and 1987 (1.8% lower than what the

respondents estimated they would spend at the beginning of 1988). Annualized, seasonally adjusted spending by the industry for third-quarter 1988 was \$11.37 billion; fourth quarter, \$12.53 billion; projected first quarter, \$15.47 billion; and projected second quarter, \$14.56 billion. Commerce reports.

The paper industry's 35.4% increase compares with a 9.6% increase planned for all nondurable goods manufacturers. The paper industry was more bullish on its spending plans for the first two quarters of this year than it was in its October/November survey. ■

Capital spending plans of some U.S. paper companies (millions of dollars).

Company	1987	1988	1989
Boise Cascade Corp.	\$259	\$452	\$700
Bowater Inc.	\$88.1	214.3	360
Champion International	334	571	850
Chesapeake Corp.	38.8	72.2	145
Federal Paper Board Co.	179.8	204.3	425
Georgia-Pacific Corp.	550	711	630
Great Northern Nekoosa Co.	250.3	282.4	500
International Paper Co.	603	645	900
James River Corp. (Apr. 30)	509	623	675
Kimberly-Clark Corp.	247.3	438.2	2,000*
Mead Corp.	175.3	350.4	650-700
Potlatch Corp.	155.2	114.3	209.5
Scott Paper Co.	380.1	508.7	1,450*
Stone Container Corp.	106	137	455
Union Camp Corp.	192	359	600-650
Westvaco Corp.	280	393	500
Weyerhaeuser Paper Co.	621	860	825
Willamette Industries Inc.	129	278	n.a.

p=Projected. n.a.=not available

*Projected 1989-90 spending.

Source: Annual reports.

Canadians plan 45% jump in spending for 1989

According to a report recently published by Statistics Canada entitled *Private & Public Investment in Canada*, the Canadian paper and allied products industry plans capital expenditures of C\$5.28 billion in 1989. This is a 45.0% jump from last year's spending of \$3.64 billion and exceeds the 35.4% increase in spending that the U.S. industry has slated in 1989, according to the latest Dept. of Commerce survey.

About 11.6% of this year's spending will be for construction, with the rest going to new machinery. Spending on repairs is expected to total \$1.76 billion—a 2.9% increase over 1988.

Capital spending by pulp and paper mills in Quebec is forecast to increase by 48.1% to \$1.55 billion. Spending by Ontario mills is forecast to rise 43.5% to \$946.5 million. British Columbian mills anticipate they will spend \$1.35 billion—up 75% from 1988. ■

UNCOATED GROUNDWOOD

Fletcher ventures into soft calendering in West

Fletcher Challenge Ltd. announced last month it will upgrade No. 2 newsprint machine at its Elk Falls, B.C., mill to soft-roll calendered paper production, making it the first to use this relatively new technology in western North America. This will initially offset production of about 20,000 metric tpy of newsprint but is likely to expand to about 60,000 tpy or more in three years, noted Ian Donald, president and CEO.

The C\$33-million modification to No. 2 machine, a 130,000-tpy unit, has already begun and should be completed by mid-1990. Kleinewefers is the major equipment supplier. The project is the third phase of a C\$60-million modernization of the Elk Falls mill. A C\$17-million thermo-mechanical pulp peroxide bleaching plant started up in late May. July should see the completion of an \$11-million revamp of some papermaking equipment that will allow for the addition of clay fillers in groundwood specialties paper production.

The technology for using twin pairs of soft calenders to make a pa-

BCTMP startups boost pulping, bleaching chemicals

CONSUMPTION. Mechanical pulp production rode the industry tide to record highs. Many of the chemical firms that supply this market met with success. The good news can be attributed to hungry pulp markets, the acceptance of bleached chemithermomechanical pulp (BCTMP), and a continuance of the fierce competition in groundwood-based-paper-grade markets.

In 1988, an additional 710,000 metric tpy of BCTMP was introduced in Canada. Another 750,000 metric tpy is tentatively scheduled through 1991. These products were required to compete with other market pulps on optical and strength specifications. Chemicals like sodium sulfite, sodium hydrosulfite, and hydrogen peroxide were called upon to meet these quality demands.

Hoechst Celanese reports new consumption highs of their V-Brite Proprieties line. Thermomechanical pulp producers are using more to get higher brightness than might be obtained with the same species used in other groundwood processes. High-concentration products are also growing. Both existing and new systems are employing it to upgrade or maintain groundwood paper product lines, which are becoming brighter, stronger, and capable of meeting the challenges coming from innovative pressroom developments.

Versene chelating agents and metal-ion control systems reached record levels in 1988 as producers became more familiar with their

processing advantages, such as higher brightness efficiencies in mechanical pulp peroxide bleaching, reduction of downtime in digesters, and improvement in hydrosulfite bleaching economics. The addition rate varies with specifications but falls between 1 to 6 lb/ton while helping to eliminate sodium silicate requirements and to bump brightness up a few points.

The real star in BCTMP growth has been hydrogen peroxide, having risen 25% in consumption in North America from 1987 to 1988. This year's forecast is anticipating similar results. The major producers—Du Pont, FMC, Interlox America, Atochem, and Degussa—all report high operating rates and great success in the BCTMP market. Consumption rates at BCTMP sites are a function of the species, equipment used (medium-consistency and high-consistency processes), brightness target (75% to 85% ISO), and process efficiency. Typical addition formulas involve peroxide charge, sodium silicate for stabilization, and caustic for alkalinity, with options on sodium hydrosulfite and metal-ion inhibitors. Sources all see an emerging technology for onsite production of hydrogen peroxide. Du Pont is developing a system that could produce up to 8 tpd.

PRICE, AVAILABILITY. New capacity of hydrogen peroxide is on the way. Interlox America will open its Longview, Wash., facility late in 1989 (45 million lb/year). Interlox reported

an industry operating rate of 90% of effective capacity, which will create tight supply situations during second-half 1989. As a result, prices should move up later this year. One supplier mentioned that any unplanned shutdown of hydrogen peroxide capacity would have a significant impact on the market. Another contact discussed producer cost impact. Hydrogen peroxide suppliers are also facing higher production costs, new plant investment, and greater R&D outlays.

Most contacts did comment on a possible recession. Du Pont mentioned that it remains optimistic about peroxide, given the industry's concern about chlorine use and the cost-competitiveness of BCTMP. Du Pont stays abreast of developments through its Pulp & Paper Network. Sometime this year, it expects to announce new and improved bleaching technologies for pulp manufacturers. FMC is also marketing the EOP process for chemical pulp bleachers, in addition to its Pulp Brite technology currently being offered to mechanical pulp producers for brightness and strength improvements in processing. FMC will start up a 66-million-lb/year plant at Prince George, B.C., in early 1990.

V-Brite will be more expensive this year. A first-quarter increase was announced for the U.S. and eastern Canada at \$0.03/lb, and another similar increase is scheduled for late second quarter. Olin, producer of Reductone and Hydrolin, also boosted prices \$0.035/lb in March.

Dow Chemical is releasing a new chelating agent (XUS-1111) for kraft mill digester application. Metal-ion control systems are also being looked at. Pressure on raw materials could force a price increase down the road.

For sodium silicate, PQ says availability is market. But the upward price spiral of alkali and energy costs could require a minor price adjustment. The company recently expanded its Tacoma, Wash. facility by 50%.

TABLE 1: Consumption and price of mechanical pulping and bleaching chemicals.

	Pulp industry consumption	Change 1988	Price change 1989
Hydrogen peroxide ¹	125 million lb	20%	5% to 10%
Sodium hydrosulfite	32,000 tons	2.5%	5% to 10%
Sodium silicate	80,000 tons	9%	0% to 5%
Sodium sulfite	135,000 tons	15%	5% to 10%

1. Consumption source: FMC Corp.

MORE PAPER MILLS INSTALL SPC/SQC AS QUALITY REQUIREMENTS INCREASE

Survey shows 74% of mills in North America have begun or are implementing programs to improve product quality, consistency

By **KELLY H. FERGUSON**, Projects Editor

Most managers agree that quality control is an ever-evolving process. This is particularly true in the North American paper industry, where change has always been rather slow and methodical. But in recent years, many mills have stepped up their quality improvement efforts, overhauling existing programs and installing new statistical tools to better understand and control the manufacturing process.

A recent *Pulp & Paper* survey of selected pulp and paper mills in North America shows that the industry is increasing its emphasis on making a quality product, but most mills feel they have a long way to go to achieve their own quality goals. As one fine paper mill respondent said, "We still have more to do. Quality improvement requirements are never ending. What we have accomplished is only the beginning."

THE STATUS OF QUALITY. *P&P's* survey showed that all mills have some type of quality program, ranging from a lab inspecting variables of the finished product to extensive process monitoring throughout the entire mill. Responses to many questions indicated confusion on what exactly is meant by "quality" and how it is achieved. In discussing the survey results, and based on past quality upgrades at mills, focus was put on statistical process control (SPC)/statistical quality control (SQC) programs.

To focus the discussion even more, SPC/SQC was defined as making a consistent quality product that meets certain standards set by either a mill or its customer. In a special report on quality in 1987, *P&P* predicted that "almost every pulp and paper manufacturer has begun or will implement an SPC/SQC program" (*P&P*, Apr. 1987, p. 69).

Of the mills responding to the current survey, 74% indicated they were using SPC/SQC programs. Of those respondents, 43% said they were currently implementing or were in the early stages of SPC/SQC (Figure 1). Those numbers closely correspond to a similar mill survey recently conducted by Huyck Felt, Wake Forest,

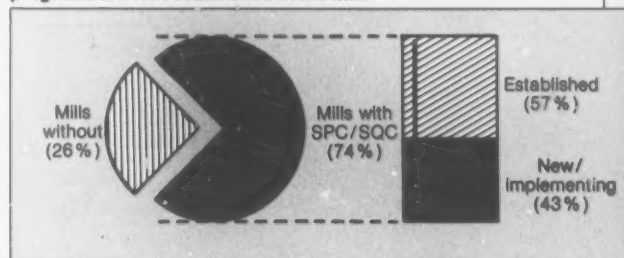
N.C., which showed 52% of respondents using SPC/SQC and 39% planning to implement SPC/SQC as part of their quality programs. Surprisingly, about 10% of Huyck's respondents said that at this time they had no plans to implement SPC/SQC.

SPC/SQC IN THE MILL. Almost all *P&P* respondents (93%) felt SPC/SQC was the wave of the future. A respondent from a West Coast tissue/specialty mill said, "SPC is one tool that can be used to improve process efficiencies and reduce waste. Those who ignore it will not be able to remain competitive." Another West Coast mill respondent noted, "From everything that I've seen, SPC/SQC is an excellent tool and should survive as the means to describe and control quality performance in the future."

Yet some respondents felt the use of such programs had taken on a faddish aspect, an opinion represented by a Midwestern mill respondent who said, "It is being treated as a fad in terms of media hype, but if we fail to adopt participative management, we are doomed to second-rate status in the world economy. SPC/SQC is just a small part of the participative approach. It will not support itself."

Another respondent said, "I feel it should be the wave of the future but am not sure it will be. The Japanese may force us to embrace SQC in a wholesale manner to stay competitive. My guess is that some of the techniques will be adopted, but the necessary cultural

FIGURE 1: Almost three-quarters of the mills responding have SPC/SQC programs, and of that 74%, the majority claim those programs are well established in the mill.



changes will not be adopted and the full benefits of SQC will not be realized."

From the respondents' discussions of their SPC/SQC programs, it seems that the two key factors in a mill's decision to implement SPC/SQC are the grades produced and the commitment of management. As would be expected, most fine paper mills (83%) already have an established SPC/SQC program.

A high percentage of market pulp and paperboard mills (about 80%) also have programs, particularly solid bleached sulfate (SBS) and high-grade bleached chemical pulp mills. About three-fourths of the specialty paper mills and a little more than half of the containerboard mills (including several recycled facilities) have similar programs. Not enough tissue or newsprint mills responded to the survey to allow the calculation of a meaningful indication for these grades.

Of the mills having SPC/SQC programs, 61% said mill management was very involved and supportive of the program. Figure 2 shows the level of involvement by management. A southern mill respondent said, "There is absolutely no way we would have made the progress we have seen during the last seven years without the on-

**P&P's survey showed that
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going help and active support of both the departmental and mill management."

A Canadian mill respondent, however, showed how the mill's management forced the SPC/SQC program to break down: "After some early successes, the program fell away because most of the planned improvements required process changes and capital equipment."

One factor that appeared to have no effect on implementation was mill size. No correlation could be made between the size of the responding mill and the level of its involvement in SPC/SQC. Of the larger-size mills

(1,500+ tpd), some did not have an SPC/SQC program in place and had no current plans to implement one, but some of the smaller mills (100 to 500 tpd) were implementing or were in the early stages of SPC/SQC.

Cost was an important consideration for 12% of the respondents in the Huyck survey. This factor was specifically cited by most of the 10% who said they had no plans for installing SPC/SQC at their mills. Up-front costs typically include training, temporary help (to allow time for training), and increased product rejects. However, most mills say these costs are not significant, particularly when considering the potential gains.

FIGURE 2: Most company management is heavily committed and involved in mill quality improvement programs, such as SPC/SQC.

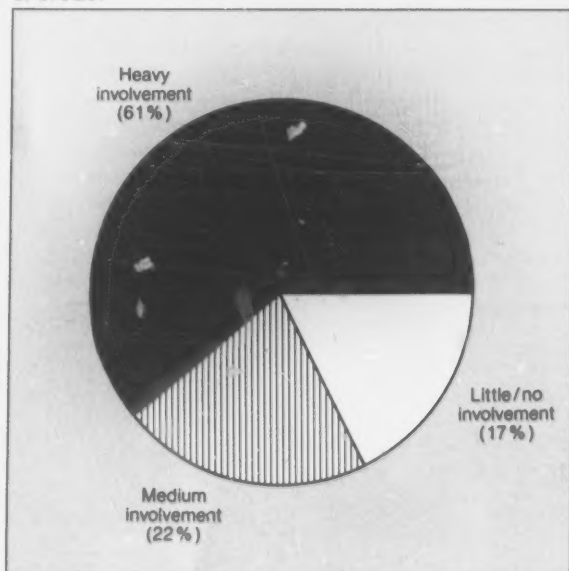
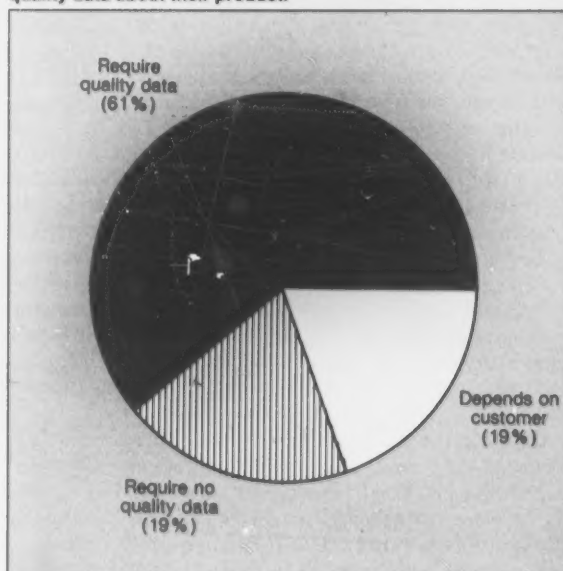


FIGURE 3: While converters and end users do not require mills to have SPC/SQC programs, most do require mills to present some quality data about their product.



THE SPC/SQC CHAIN. In P&P's 1987 quality report, a chain was discussed in which suppliers would be required to implement SPC/SQC programs, just as mills were being required to do by converters and end users. According to the respondents in this survey, end users may not be forcing SPC/SQC on mills, but 61% of the respondents said they must present some kind of quality data, and 19% said it depends on the particular customer (Figure 3). Data required of mills includes, among other things, average test data, control charts on specific attributes, basis weight, caliper, moisture, and evidence of an SPC/SQC program.

A 310-tpd recycled paperboard mill that has an SPC/SQC program said its customers "currently require only the raw data [basis weight, caliper, moisture] in raw form. In the near future they will be requesting control charts."

At the other end of the chain, only 16% of respondents in the P&P survey said they require their suppliers to have SPC/SQC programs. However, comments by respondents suggest that, in general, they do require some kind of quality information. The Huyck survey indicated that papermakers are somewhat more demanding of their suppliers, with 32% reporting that vendors must have or be in the process of initiating an SPC program. Some 48% of the Huyck respondents said vendors that use SPC/SQC will usually be chosen over those who do not.

A southern specialty paper mill respondent to the P&P survey said, "We require SPC/SQC of all our suppliers and are currently working with our chemical, wood-

pulp, and clothing suppliers in a formal vendor relations program. We do formal vendor ratings and use the ratings in determining vendors and market share." A survey respondent from another southern mill commented, "Most major suppliers seem to be emphasizing quality control, although some may be using it only as good public relations, while others are actually implementing it."

Respondents to the P&P survey said their mills require various data from suppliers, including assurance of product consistency, information on key properties, individual tests on shipments of chemicals, furnish averages, and control charts. Most respondents said suppliers were generally cooperative in offering required data.

Comments from the respondents show that many are beginning to investigate the requirement of SPC/SQC programs by suppliers, and some say their suppliers already have programs in place. Federal Paper Board Co.'s Riegelwood, N.C., mill, one of the first to use SPC/SQC in the paper industry, has a different approach to working with chip suppliers. "Since many of our purchased chip suppliers are small operations, we have tended to do much of the statistical analysis for them. We then work with individual suppliers to correct problems that are uncovered by our purchased chip quality improvement program."

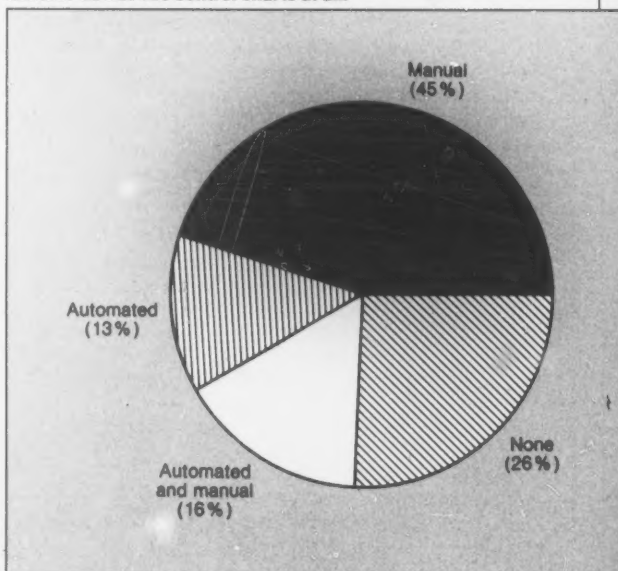
SPC/SQC PROGRAM BASICS. The P&P survey included a number of questions on the basics of the quality programs in the mills. Organization of quality pro-

SPC/SQC reference material

Most of the Pulp & Paper survey respondents, when asked what reference sources they use in their SPC/SQC programs, gave extensive lists of works they considered valuable. Obvious ones included works by Deming, Juran, and Crosby. Not all of their choices could be listed. The following works, however, were mentioned repeatedly:

- Grant and Leavenworth's "Statistical Quality Control"
- Scherkenbach's "The Deming Route to Quality and Productivity"
- Materials from the Univ. of Tenn.'s Institute for Productivity through Quality
- Stone Paper Co.'s SPC manual
- Various materials from Tennessee Associates International
- Messina's "Statistical Quality Control for Manufacturing Managers"
- Peters' "Thriving on Chaos"
- Juran and Gryna's "Quality Planning and Analysis"
- Ishikawa's "Guide to Quality Control"
- Fellers' "SPC for Continuous Processes."

FIGURE 4: A majority of mills use manual control charts or both automated and manual techniques. However, a surprising number do not use control charts at all.



grams was one area where most mills differed greatly. Descriptions that were submitted by respondents ranged from a "quality supervisor responsible for answering complaints and doing customer service" to "multi-tiered quality organizations within the mill." Most mills did have a quality "champion" of some kind, and some had an actual committee to implement improvements in the programs.

A majority of the mills use manual control charts (45%) instead of automated systems (13%); 16% use both (Figure 4). One of the reasons that many mills continue plotting manually is shown in a response from an employee at a specialty paper mill in the South: "There has been some discussion of automated plotting later, but the plotting skills and personal involvement required are thought to be extremely important in the overall SPC culture change."

A second reason for charting manually, according to another southern mill respondent, is "because the degree of automation in our plant does not currently support widespread use of the computers for this purpose." A 1,000-tpd linerboard mill found automated techniques more suitable. "Originally, we wanted manual efforts. We now believe it makes more sense to take advantage of existing distributed control systems and other process control equipment to plot and display data." No specific vendor was mentioned as a major supplier for automated systems. Measurex, Bailey Controls, and Honeywell were named, and many mills said they developed their own software to chart variables.

The following are other statistics concerning mill SPC/SQC programs:

- Seventy-four percent believe all branches and product lines would benefit from an SPC/SQC program. Spe-

Managers comment on quality

Many of the respondents to the *Pulp & Paper* quality survey commented on various aspects of quality control in the industry, including evaluating their own programs. The following selected comments include a brief description of the topic (edited for grammar and style as necessary).

"My 22 years of experience says that there are perceptions and there are realities. I have not yet found a match between perceived quality image and inplant policies and systems. Companies whose presidents speak the loudest are the ones I'm most skeptical of."

— comment on whether there are quality leaders in the paper industry from midwestern paperboard mill

"SPC is applicable to every process. To ask the question, 'Which process would benefit the most?' is to assume that there are processes operating at perfection. The question is not, Where should SPC be applied? but, Where should you start? You should start in an area where you think you have a chance to succeed. The first efforts should be selected to yield early fruit. You can then build on success."

— comment on what product lines would most benefit from quality programs from a southeastern market pulp/paperboard mill

"Seminars are usually not effective, except for obtaining the statistical background. The continuous nature of our processes and the large number of variables make implementation difficult. Paper mill examples are needed."

— comment on current quality control seminars and conferences from a West Coast specialty paper mill

"Any product line can benefit from a good quality program. The higher the quality demand, the more the benefit from a practical point of view."

— comment on what product lines would benefit most from quality programs from a northeastern specialty paper mill

The following comments are evaluations of mills' current quality programs. Most mills called their programs successful but said there was room for improvement.

"Some success, but very slow progress. This involves a major culture change. Results to date are better products (we have improved our competitive position), more consistent products, lower costs, a safer mill, and lower water and energy use per ton."

— southeastern containerboard/newsprint mill

"Too early to tell. The verdict is still out."

— midwestern recycled paperboard mill

"We have cut defects, rejects, complaints, and other related quality costs significantly during the past few years, while increasing yield, shippable tonnage, and our overall quality image. The quality program has contributed to our overall corporate success and bottom-line profit significantly. Quality does pay!"

— southeastern specialty paper mill

"At this point, we have been able to develop an overall awareness of the importance of quality in all of our products."

— Canadian market pulp/containerboard mill

"When I look at our SPC program during the last seven years, I am both amazed at how far we have come and appalled by how far we have to go. I judge the program a success because we are still committed to it. SPC is a slow process of continuing improvement."

— southeastern market pulp/paperboard mill

"Our program has succeeded in making quality a priority over production. More can be done, especially as customers ask for evidence of quality performance."

— southern linerboard mill

cific grades included fine paper grades, specialty grades, and market pulp.

- Fifty-eight percent of the mills have all management and operating personnel trained in at least the basics of quality control; 26% have only management or a few key personnel trained; 16% said they have no training at all or no formal training.

- Only 9.6% used outside consultants for program training; 58% said they trained in-house, although many of the key personnel were trained by consultants or through seminars; 19.3% specifically said both in-house methods and consultants were used.

- More than 38% said they have annual or semiannual meetings with customers to discuss product quality; 16% said they met quarterly; 6.6% met monthly; 38.7% said they did not organize any specific meeting times.

- Slightly more than 77% use Pareto diagrams to evaluate problem areas.

- Fifty-five percent use control charts on finished product properties or attributes.

- Sixty-four and a half percent said current seminars and conferences on quality control were meaningful. Some of the seminars included the Univ. of Tenn.'s Institute for Productivity through Quality, Tennessee Associates International, Qualpro, and some seminars offered by TAPPI and CPPA.

- When asked if there were leaders in the area of quality both within and outside of the paper industry, respondents came up with several interesting answers. Those listed included the auto industry, Federal Paper Board, James River Corp., Weyerhaeuser Paper Co., Proctor & Gamble Paper Products Co., Engelhard Corp., and Dow Chemical USA.

"It is successful. We have excellent communications between our customers, sales department, management, and quality control groups. We know our customers needs and manufacture accordingly. Personally, I feel SPC would increase production and quality and reduce costs. Down the road we may move in this direction."

— southern line paper/paperboard mill

"We have established our product as best in our market niche, but we have a lot to do if we are going to maintain this position."

— western market pulp mill

"The program has been successful, but it needs to be expanded."

— northeastern recycled boxboard mill

"It has been successful, but it can be improved. Overall quality is good, and some qualities have earned us a good reputation in the industry."

— southeastern containerboard mill

"Our quality process is successful because after one year it is still here. We have had one success and are struggling with several other teams. Our employees still talk about it and realize it is here to stay. That is the most an organization entrenched in old-style management could hope to accomplish in one year."

— northern paperboard mill

"Program somewhat successful but can be improved. Need more accountability by production."

— southwestern paperboard mill

"We feel our quality control program has been very successful. Customers tell us our products are top of the line. We have received supplier of the year awards from three of our customers."

— southwestern fine paper mill

"Successful but very slow moving. We have distinct improvement in performance within the mill, but too many excursions are due to deficiency of quality awareness. The potential is there but not nearly where it needs to be on communication and teamwork. But we are pressing hard on these key factors. It seems to take forever."

— southern market pulp mill

"We have been successful but believe that implementation of SPC will enhance our competitive effectiveness. Our work force is, in general, quality conscious. We need to provide the tools to reduce and control process variability."

— west coast specialty paper mill

"The quality control program at this mill is well established and well regarded. In the 'classical sense,' it functions well. Our program is, however, not operator-based enough to gain strong ownership by operators. The division's quality improvement process is just getting under way in a formal sense. Its success has yet to be proven."

— midwestern fine paper mill

"Our program has been successful, but it can still be improved. Our product has been applauded for its high quality."

— southern linerboard mill

"We use mostly inspection but need more preventive measures. Use of charts is only part of the program. The biggest need is to have top management set quality control objectives. At our mill, this is not the case. There is too much lip service."

— midwestern specialty paper mill

"Our program, even after two to three years, is still in its infancy. We've accomplished about 30% to 40% of what we need to do to meet our intermediate-range goals."

— northern specialty paper mill

API LOOKS AT INDUSTRY'S ROLE IN EVOLUTION OF SOLID-WASTE ISSUES

Involvement spurred by political pressures fomenting major changes that are expected to affect the paper industry in the long term

By NOEL DeKING, News Editor
and DEBRA GARCIA, Senior News Editor

The subject of solid waste is increasingly affecting businesses other than garbage disposal. It is particularly impacting the paper industry because of its high recovery record and the huge portion of its products that find their way into the waste stream.

Realizing this, the American Paper Institute began to give the issue of solid waste higher priority and last year formed a committee, the Solid Waste Task Force, to take a closer look. At this year's Paper Week, Mar. 13-15, API highlighted solid waste in its Open Industry Forum and then, on Mar. 16, held a day-long seminar on international wastepaper markets.

As noted by R. Eugene Cartledge, chairman of Challenges and Opportunities for Paper, "It [is] hard to envision any municipal solid-waste solution that will not have paper and paperboard in its formulae." Cartledge, who is also president and CEO of Union Camp Corp., has served as the Solid Waste Task Force's first chairman.

Jerry Powell, editor of Resource Recycling Magazine, indicated that a "new forest" was being nurtured by the businesses and homes adding their scraps to the recycling effort. He indicated that this would provide the pa-

per industry with a "significant business opportunity," and the industry's response to it would be "one of the more important decisions you make this decade."

The recyclers' enthusiasm, however, has not been matched by a similar reaction from papermakers, who consider municipalities and other newcomers to the recycling business to be in need of some experience in the realities of the marketplace. The problem for the recycling movement is that it has been based more on a supply-driven objective rather than a market-driven goal, noted William E. Franklin, president of Franklin Associates Ltd. The paper industry supports recycling by expanding markets first, not supplies.

SUPPLY-DRIVEN MARKET WILL NOT WORK. In the past, wastepaper supply has been a function of demand by manufacturers. Now, it is becoming "more a product of government regulation requiring the source separation of recyclable materials," said James B. Malloy, president and CEO of Jefferson Smurfit Corp. "As we move to a supply-driven approach to recycling, materials will be collected for which there is no market. Imbalances in supply and demand could be significant for certain grades, particularly in the near term."

A high percentage of paper is already recycled—29.8% of new supply was recovered for recycling in 1988, of which 20.8% was postconsumer wastepaper, such as old newspapers (ONP), old corrugated containers (OCC), office paper, and mixed paper, he noted. In fact, recovery for recycling has grown so rapidly that in 1988, the total paper going to disposal was flat with 1987, despite the growth in demand for paper products.

The paper industry uses a ratio of wastepaper in its furnish equal to 25% of total paper and board output; this has been increasing in the last three to four years, while woodpulp has been declining. The U.S. collected 25.7 million tons of wastepaper in 1988 and exported 5.6 million tons. The collection and recycling of ONP hit a record high of 4.5 million short tons in 1988, up 31% compared with just five years earlier. This is almost double the rise in newsprint consumption during the same period and represents a recovery rate of 33% of the newsprint used in the U.S.



API's annual luncheon speaker was noted journalist Pat Buchanan, shown here with Eugene Cartledge (left), chairman of API, and Red Cavaney (right), president of API.

TASK FORCE CONSIDERS SOLUTIONS. During the past year, API's task force has been "analyzing the municipal solid-waste issue, assessing its impact on the industry, and, if necessary, recommending a revised industry policy on the challenge before us," noted Malloy, a cochairman of the committee. It has drafted a policy on solid waste, which was adopted by API. Addressing the solid-waste solutions of source reduction, recycling, waste-to-energy plants, and landfilling, the task force drafted its own position that "is grounded in the philosophical belief that effective solutions require a balanced, integrated, locally tailored, and economically driven approach to waste management," said Malloy.

Source reduction was considered by the task force to be too costly, particularly considering that it probably would not make much of a difference in the amount of garbage generated. "By comparison, many think we can, over the next several years, recycle as much as 20% to 25% of the waste stream and incinerate even more," noted Malloy.

He also said, "API supports phased-in source separation of waste stream components as a first step in the efficient and effective management of municipal waste."

Given time, it will lead to economically efficient determinations about where our waste should go. It will also serve to maximize use of the recyclable portion of the waste stream."

INDUSTRY AT ODDS WITH POLITICIANS. Solid-waste managers and government officials do not see new landfills or waste-to-energy incinerators as the best political solutions to the waste crisis, though. They have placed a higher priority on other means of disposal, such as source reduction and recycling—both of which will affect the paper industry, said Franklin.

In their efforts at source reduction, for example, they are considering taxing such end uses as newspapers and

FIGURE 1: Gross generation of products in municipal solid waste, 1986.

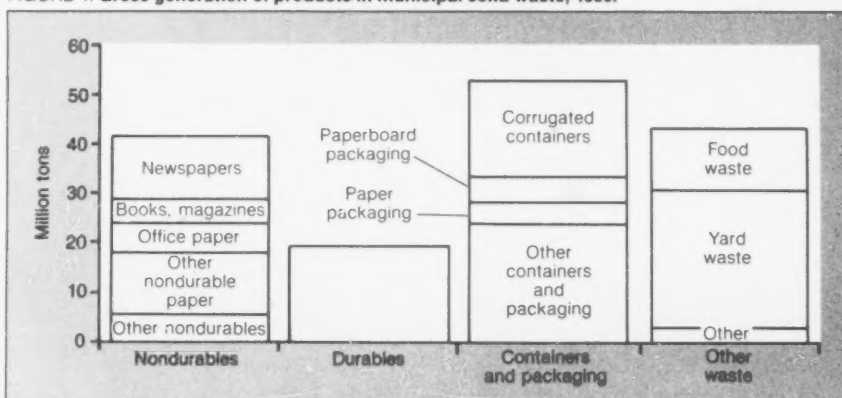
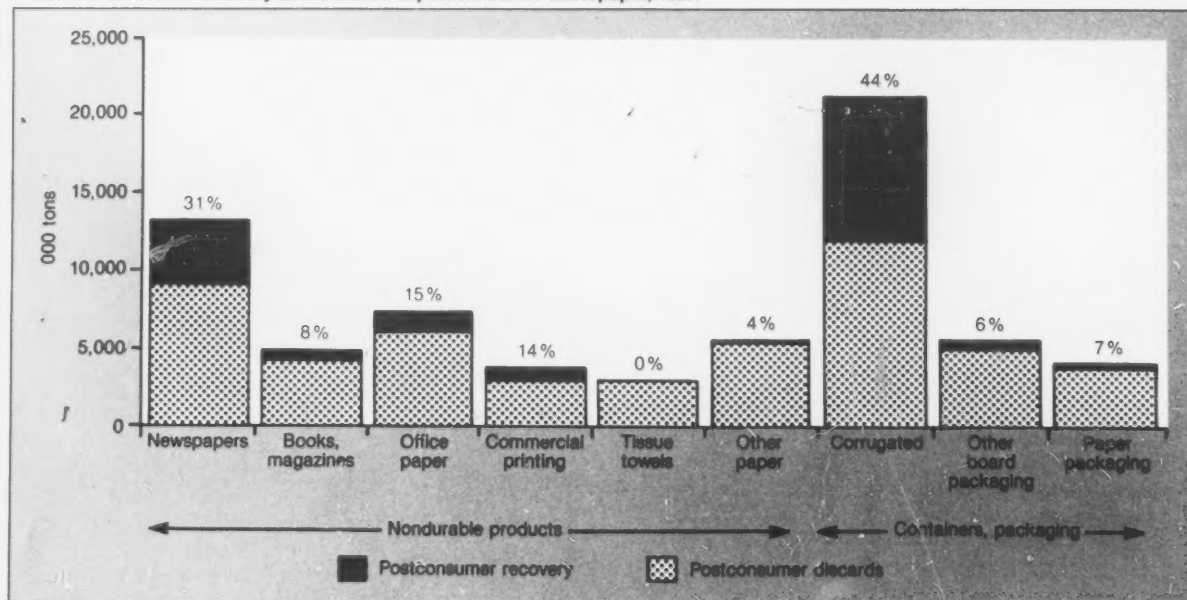


FIGURE 2: Estimated recovery and discards of postconsumer wastepaper, 1987.



packaging. Judd Alexander, executive vice president of James River Corp., noted that a 2¢/carton tax in Florida would levy a surcharge of \$731/ton on the half-pint milk container. In New York, N.Y., a tax of 3¢ was proposed for every setup package; at that rate, a Kraft Dinner carton would mean a tax of 150%.

"If one or two of these pass, we could see a rapid spread first for packaging and then for disposables, and maybe even reading material," said Alexander. "The industry must play a role in bringing about these solutions ... or suffer the consequences," he added.

Franklin noted that one new source of hope has been renewed interest in using industrial boilers to burn a densified fuel derived from solid waste. A fiber-based fuel with paper and paperboard appears to be a viable option, he said, indicating that "many paper mills do burn coal and/or hog fuel, both of which are compatible with densified fuel in the form of pellets, cubes, or briquettes."

API TO HELP SITE LANDFILLS. In addition, API has agreed "to work with local governments to identify possible sites on land owned by API companies that may be suitable for new disposal facilities." Of all the options, though, recycling remains the most popular with the general public. The U.S. Environmental Protection Agency and the Bush Administration both have set a goal of 25% source reduction in solid waste by 1992. "Although unrealistic in its time frame," Franklin said, "this is not unrealistic as a goal (eventually)." Currently,

the national recycling rate is about 12%, mostly due to recovery of recyclable postconsumer wastepaper grades, said Franklin.

The industry also considers waste-to-energy and paper recycling compatible, provided recyclers are given first access to the recyclable portion of the waste stream. "Our market-based approach to waste management dictates that materials should flow to their most economically efficient end use. In this respect, recyclers should be allowed to compete fairly for the recyclable portion of the waste stream," said Malloy.

The projected increase in wastepaper utilization of 12 million tons would mean that more than half of the projected 22-million-ton increase in production would have to be recycled-fiber based, Franklin noted. "This is most likely to occur, in fact, unless some very dramatic reallocation of capital investment takes place," he said.

How much recycling can the industry do? "It is our view that with a market-driven approach to recycling, we will increase collection rates and utilization of wastepaper significantly over the next decade," said Malloy.

"The point is that recycling can play an important role in waste management, but society cannot recycle its way out of the solid-waste dilemma. Irrespective of the success of source reduction and recycling initiative, there will still be approximately 150 million tpy of garbage to burn or to bury," he said.

Exports may not be the answer to the garbage problem, either. Noted Franklin, "Exports are a two-edged sword in terms of municipal solid waste. A high percentage of paper exported comes back to the U.S. as packaging that is largely unrecyclable; whereas, the fiber recovered and recycled in the U.S. does not exhibit this problem."

WORLDWIDE USE RISING.

Speakers at API's first international wastepaper recycling symposium were generally optimistic about secondary fiber demand trends in North America, Latin America, the Far East, and Western Europe. Consumption is growing in these regions of the world because of high operating rates at existing recycled operations, new mills coming onstream, and board and paper production records being set each year.

"This upward movement will likely continue during

TABLE 1: Wastepaper use in 20 countries, 1987-88.

	Wastepaper recovered (000 tons)	Wastepaper consumed (000 tons)	Recovery rate (%)	Utilization rate (%)
U.S.	26,000	20,100	31	24
Canada	1,400	830	23	5
Mexico	1,250	2,070	47	65
Brazil	1,570	1,600	34	31
Venezuela	320	400	35	50
Colombia	225	245	42	50
U.K.	2,700	2,300	30	56
France	2,550	2,460	35	42
Denmark	345	250	29	69
Fed. Rep. Germany	4,735	4,310	41	43
Netherlands	1,410	1,480	55	68
Belgium	610	260	35	24
Italy	1,600	2,380	26	44
Spain	1,660	2,220	41	50
Portugal	305	325	44	44
Japan	12,000	12,590	48	49
People's Rep. China	2,600	2,900	20	25
Rep. Korea	1,420	2,630	43	68
Taiwan	1,140	2,385	40	87
Australia	690	605	30	36

Note: All figures are metric tons except U.S.

Sources: American Paper Institute; Canadian Pulp & Paper Assn.; European Confederation of Pulp, Paper & Board Industries; Food & Agricultural Organization of the United Nations; Pulp & Paper International.

all of 1989 as it did last year," stated J. Rodney Edwards, API's vice president-paperboard group. "Most Asian nations have maximized their domestic collections and, therefore, depend on imported wastepaper to take care of their growth in demand." The U.S. also has seen dramatic increases in exports to developing countries that are without pulp-producing capabilities and still dependent on small, older mills that rely exclusively on wastepaper and other secondary fibers.

Henrik Kroner, representing the European Community's paper industry confederation, CEPAC, welcomed the rise in wastepaper utilization and recovery in Europe. In 1988, some 16.5 million metric tons of wastepaper were used in Europe, representing about 48% of the paper industry's total fiber supply. Europe's needs still exceed collection volume, so imports are still required, particularly in Spain and Italy.

Gerry West of Severnside Waste Paper Ltd. noted that a record 2.7 million tons of wastepaper were collected in the U.K. in 1988, and some 400,000 tons were exported, mostly to mainland Europe. Due to the high price of market pulp, the demand for high-grade pulp substitutes exceeded supply, but ONP was in oversupply.

Spain and Portugal are also enjoying above-average economic growth, which is boosting demand for all paper grades, said Jose-Antonio Buenaposada of Carto-Espana SA. In 1988, Spain imported 560,000 tons of wastepaper, with about 32% coming from the U.S. Like Italy, Spain's use of wastepaper is increasing faster than its collection rate.

FAR EAST STILL MAJOR CONSUMER. The Far East continues to be the biggest buyer of U.S. wastepaper exports, even though domestic collection systems are sophisticated. In Japan, some 70% of OCC and 94% of ONP was recovered from the total of 12 million tons of wastepaper collected in 1988. But this still did not meet demand, said Hiromi Umehara of Kasho (USA). Consumption of wastepaper in Japan represents slightly more than 50% of total papermaking furnish. Net imports dropped to 590,000 tons in 1988, but Japanese brokers increased exports to offset low domestic prices. The U.S. supplied upwards of 90% of this total.

Rep. Korea and Taiwan imported well over 1 million tons of wastepaper from the U.S. in 1988. Rep. Korea depends on wastepaper to supply 68% of its papermaking fiber, and domestic collection falls significantly short of this level, said D.K. Cho of Chonju Paper Manufacturing Co. Rep. Korea will need an additional 160,000 tpy of wastepaper to support planned expansions in the country's paper and board sector. Most of the additional volume is expected to come from the U.S.

German Esquerra of Smurfit Latin America reported that in 1988, Mexico imported 820,000 tons of wastepaper and 550,000 tons of pulp. OCC imported from the U.S. is of such high quality that it is actually considered a pulp substitute, he noted. Mexico will likely increase

its imports of wastepaper to meet demand, rather than raise collection rates. The close proximity of the huge U.S. market also means that most of these imports will come from the U.S. This will likely be the trend in other Latin American countries as well.

Canada's abundance of forest resources diminishes its dependence on wastepaper fibers, reported Gordon Minnes of the Canadian Pulp & Paper Assn. Nevertheless, 40 of Canada's 145 mills use some wastepaper in their stock. In 1988, Canada used 1.8 million tons of wastepaper for 11% of its papermaking furnish. Some 50% of this volume is OCC used to manufacture paperboard packaging. Canada imported 584,000 tons of wastepaper from the U.S. in 1988 to supplement its domestic collection. Some incremental increase in wastepaper use is expected in the future, but gains will be modest, said Minnes.

U.S. NUMBER ONE EXPORTER. Edwards noted that the U.S. is the leading exporter of wastepaper; the top five importers are Rep. Korea, Taiwan, Mexico, Japan, and Canada. In the U.S., about 200 mills use wastepaper exclusively, and another 100 mills use between 10% and 50% wastepaper in their furnish. Old corrugated is the largest category of wastepaper used, at about 9.7 million tons, followed by ONP, 3.2 million tons; pulp substitutes, 2.9 million tons; mixed paper, 2.2 million tons; and high-grade deinking, 1.7 million tons. The highest wastepaper utilization is in recycled paperboard, tissue grades, newsprint, and semichemical corrugating medium.

Five U.S. states currently have mandatory recycling laws, and more states and cities are expected to follow with their own recycling schemes in the next few years. This will dramatically increase wastepaper supply, and any oversupply will probably be exported, said Edwards. The domestic industry is forecast to boost wastepaper consumption to 26% of its fiber supply by 1990—not enough to offset the expected increase in new supply. ■

API guidelines for recycling

1. Phase in source separation programs to minimize dislocations in supply and demand.
2. Focus on specific grades of paper for which there is likely to be a market.
3. Emphasize wastepaper quality. Communities must realize the importance of generating clean, grade-separated paper.
4. Market recyclable materials based on the avoided cost of disposal. This will provide sufficient and efficient incentive to maximize paper recycling over time.
5. Rely on private collection and distribution systems to the maximum extent possible. It provides a solid foundation upon which we must expand our efforts.